



→ **ATMOS 2018**

Atmospheric Science Conference

Sentinel 5 Precursor Ozone Column products

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1) Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany

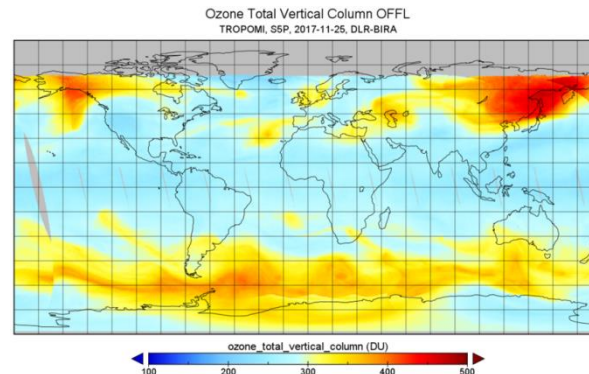
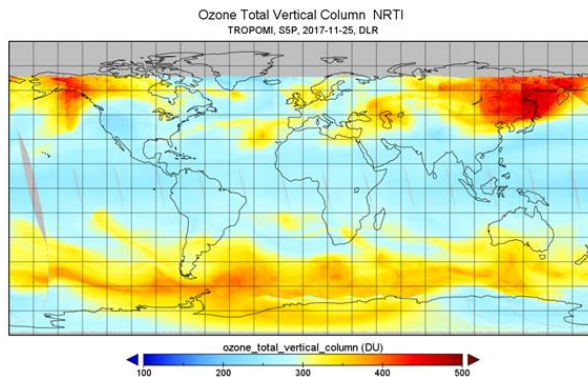
2) Koninklijk Belgisch Instituut voor Ruimte-Aeronomie (BIRA-IASB), Belgium

3) Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης (AUTH), Greece

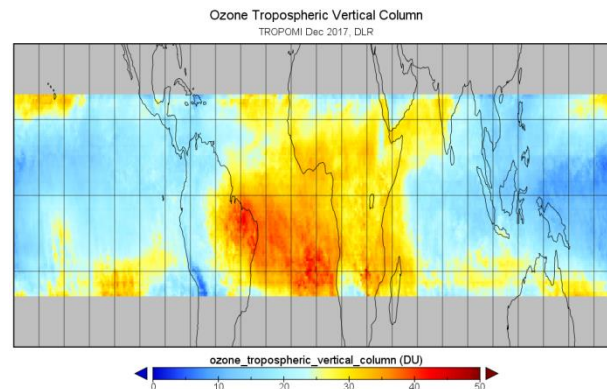
4) Institut Royal Météorologique (IRM-KMI), Belgium

Near Real Time (DOAS) Offline (GODFIT)

Total
column

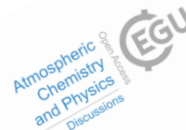


Tropical
tropospheric
column





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in der Helmholtz-Gemeinschaft



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in der Helmholtz-Gemeinschaft



TROPOMI/S5P ATBD of ozone data products



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Monitoring and assimilation tests with TROPOMI data in the CAMS system. Part 1: Near-real time total column ozone

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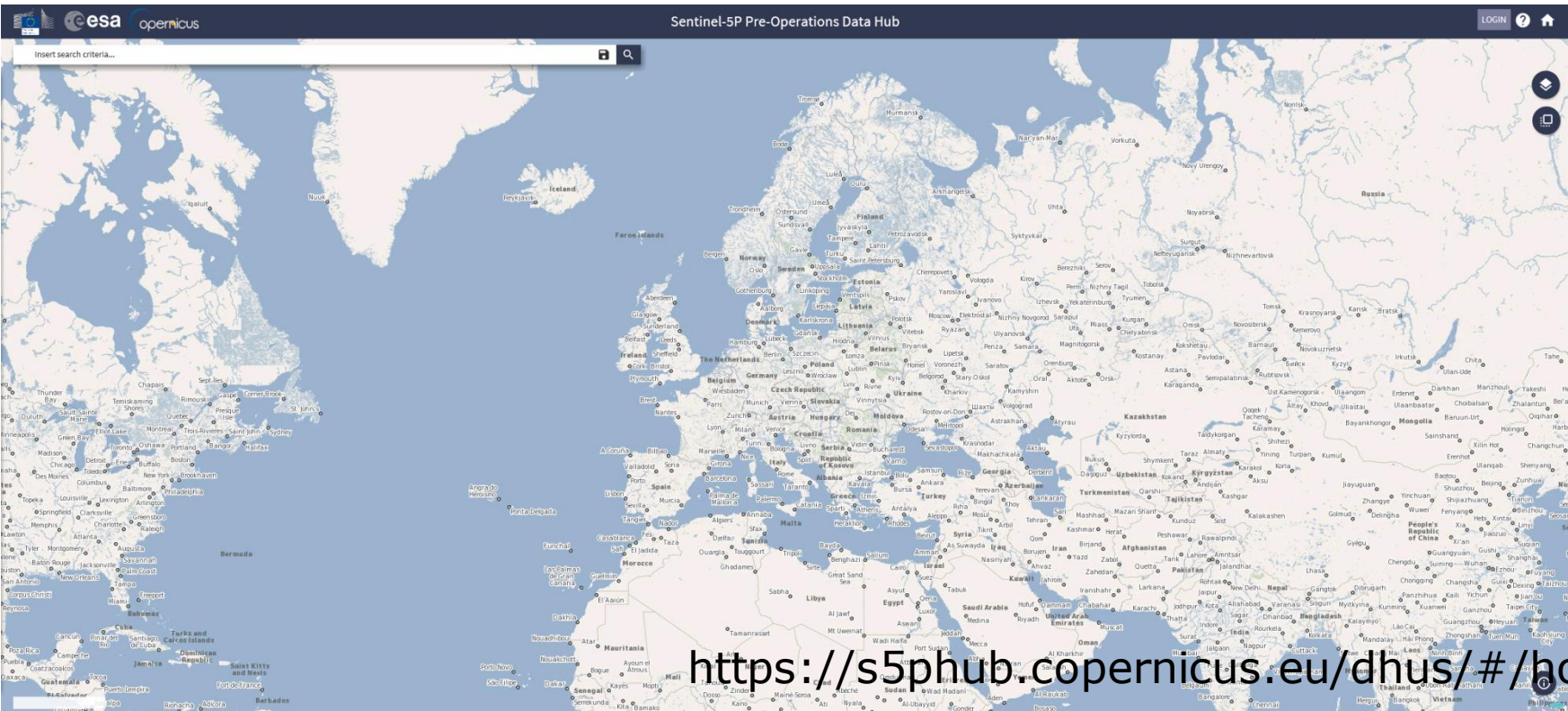
Abstract
The TROPospheric Monitoring Instrument (TROPOMI) on board the Sentinel-5 Precursor (S5P) satellite launched in October 2017 yields a wealth of atmospheric composition data, including retrievals of total column ozone (TCO3) that are provided in near-real time (NRT) and off-line. These NRT TCO3 retrievals (V1.0.0) have been included in the data assimilation system of the Copernicus Atmosphere Monitoring Service (CAMS), and tests to monitor the data and to carry out first assimilation experiments with them have been performed for the period 26 November 2017 to 3 May 2018. TROPOMI was still in its commissioning phase until 24 April 2018. Nevertheless, the results show that, even at this early stage, the TROPOMI TCO3 data generally agree well with the CAMS analysis over large parts of the globe and also with TCO3 retrievals from the Ozone Monitoring Instrument (OMI) and the Global Ozone Monitoring Experiment-2 (GOME-2) that are routinely assimilated by CAMS. Monitoring the TCO3 NRT data from TROPOMI shows some initial assimilation at high latitudes, at low values.

TROPOMI Total Ozone ATBD



document number : SSP-L2-DLR-ATBD-400A
authors : Rob Spurr, Diego Loyola, Michel Van Roozendael, Christophe Lerot, Klaus-Peter Heue, Jian Xu
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Sentinel 5 precursor data



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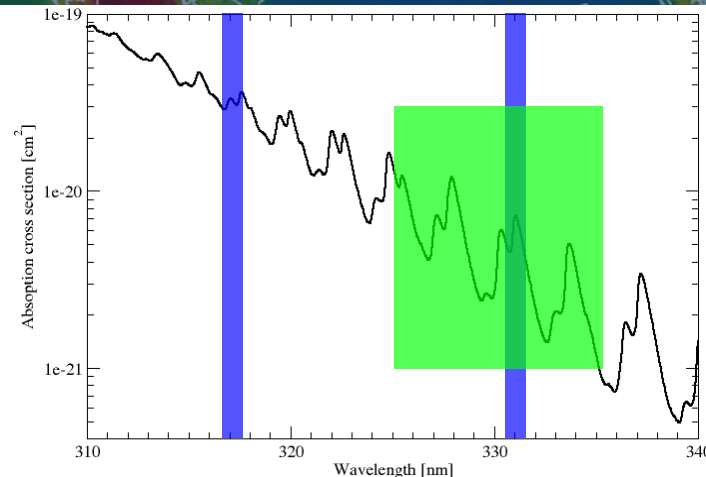
European Space Agency

TOMS

317.5 and 331.2 nm

Version 8 in 2004

TOMS on Nimbus 7 and Earth Probe, OMI on Aura



NRTI (GDP 4.8)

DOAS from 325 to 335 nm

AMF at 325.5 nm / 328.2nm (S5P)

Version 4 in 2004

GOME/SCIAMACHY/GOME-2/S5P

OFFL (GODFIT 4)

Direct fitting from 325 to 335 nm

Version 4 ESA_CCI

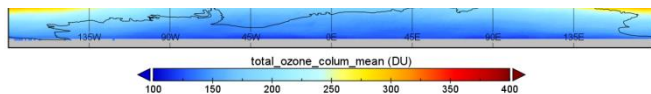
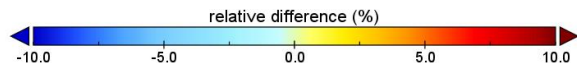
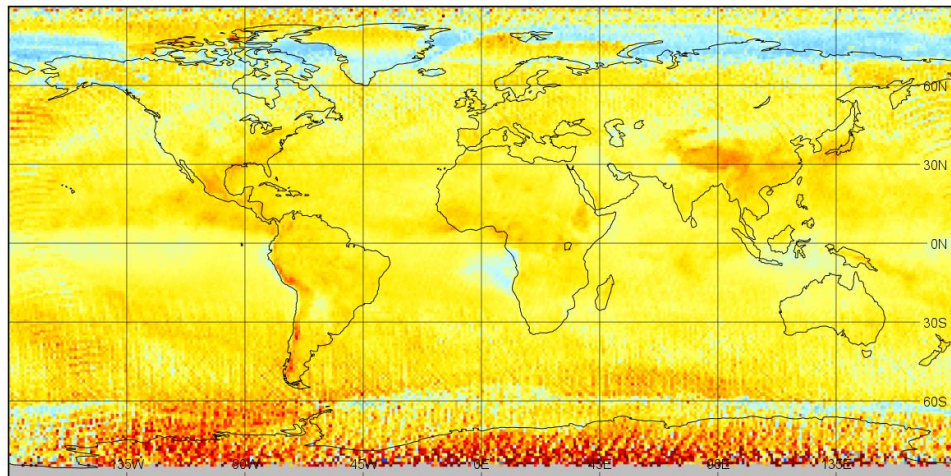
GOME/SCIAMACHY/GOME-2/OMPS/S5P

Comparison to OMPS

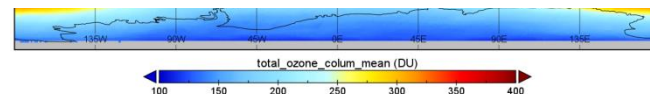
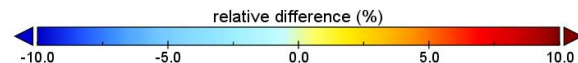
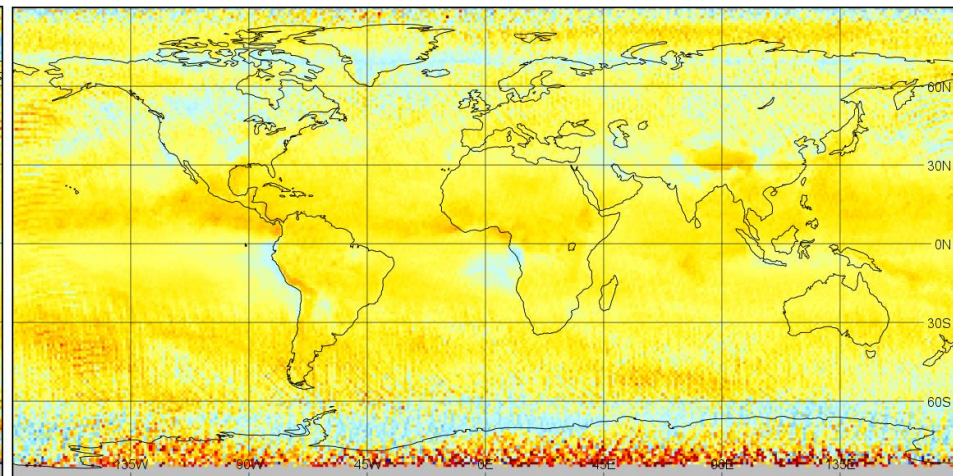
Total ozone column
OMPS 2018-09-01-2018-09-30



Total ozone column
TROPOMI_NRTI - OMPS 2018-09-01-2018-09-30

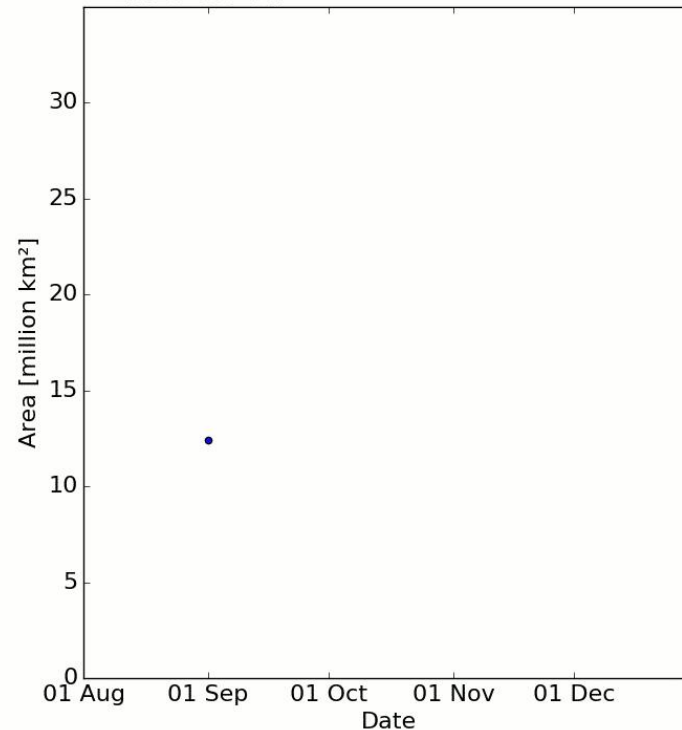
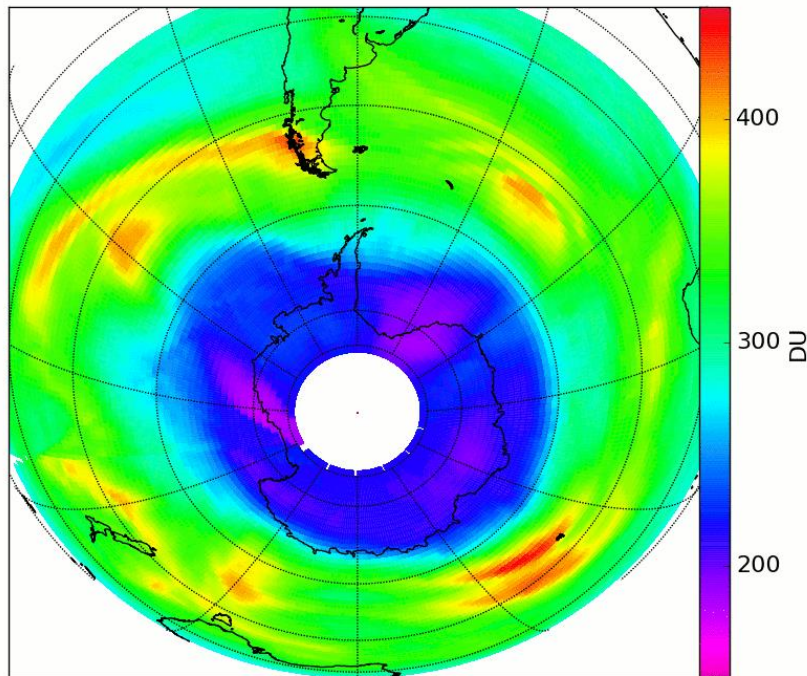


Total ozone column
TROPOMI_OFFL - OMPS 2018-09-01-2018-09-30

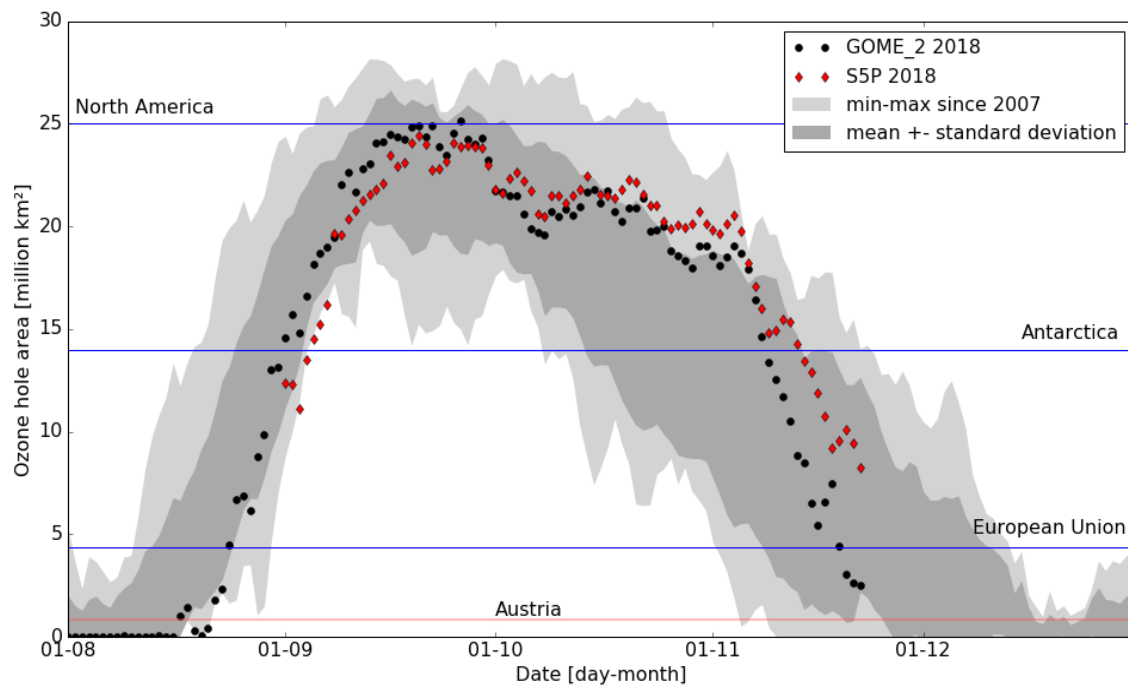


Sentinel 5 Precursor, total ozone, DLR-BIRA

2018-09-01



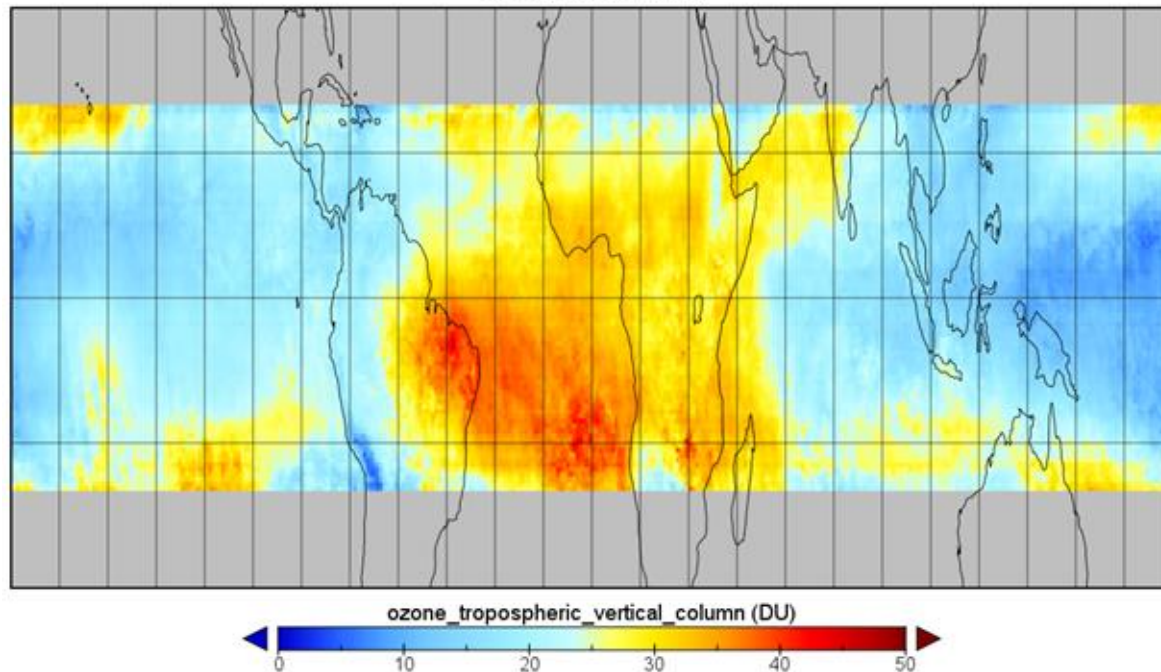
Ozone hole size 2018

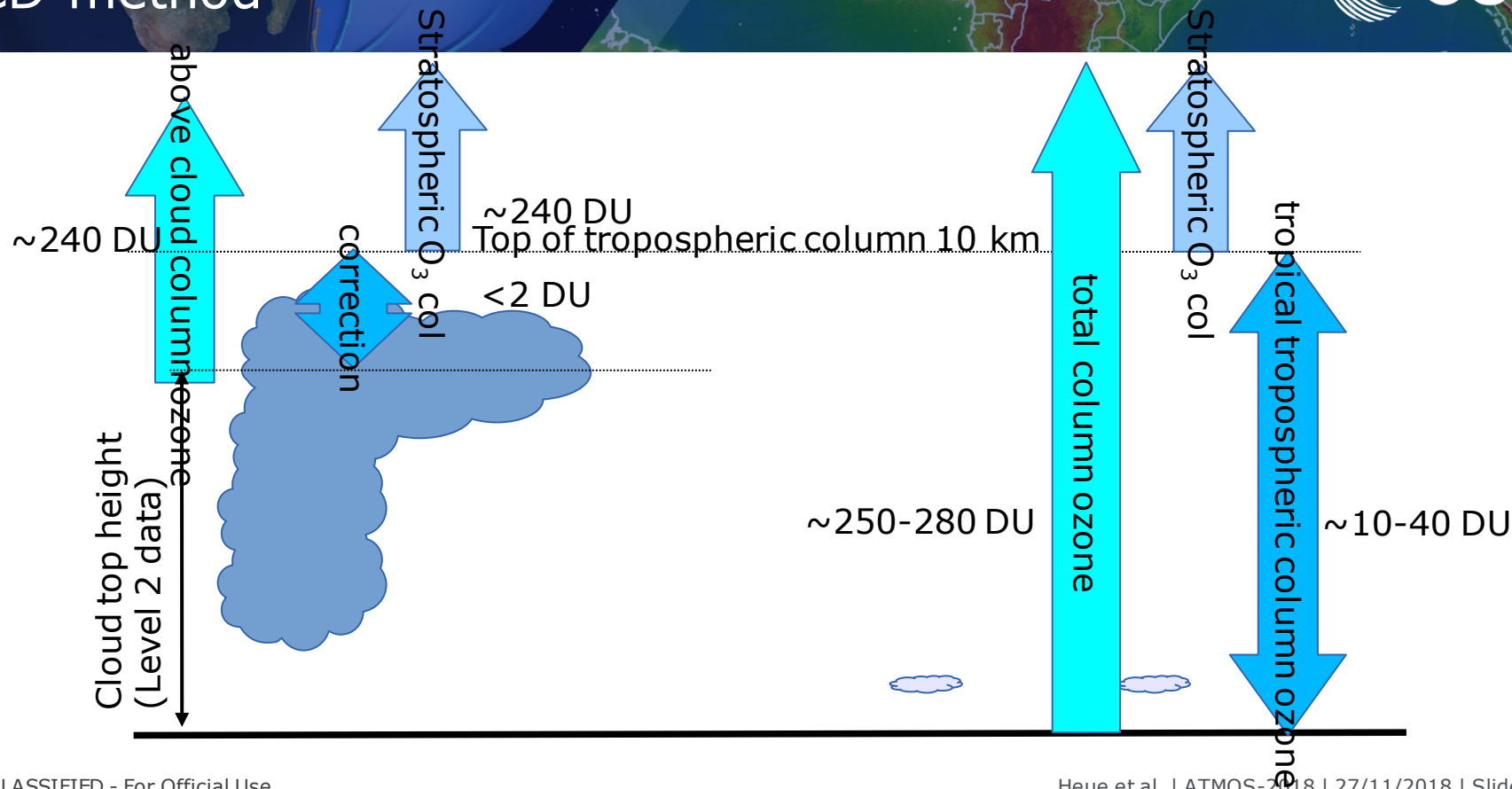


Tropical Tropospheric Ozone Column

Ozone Tropospheric Vertical Column

TROPOMI Dec 2017, DLR





Comparison to OMI

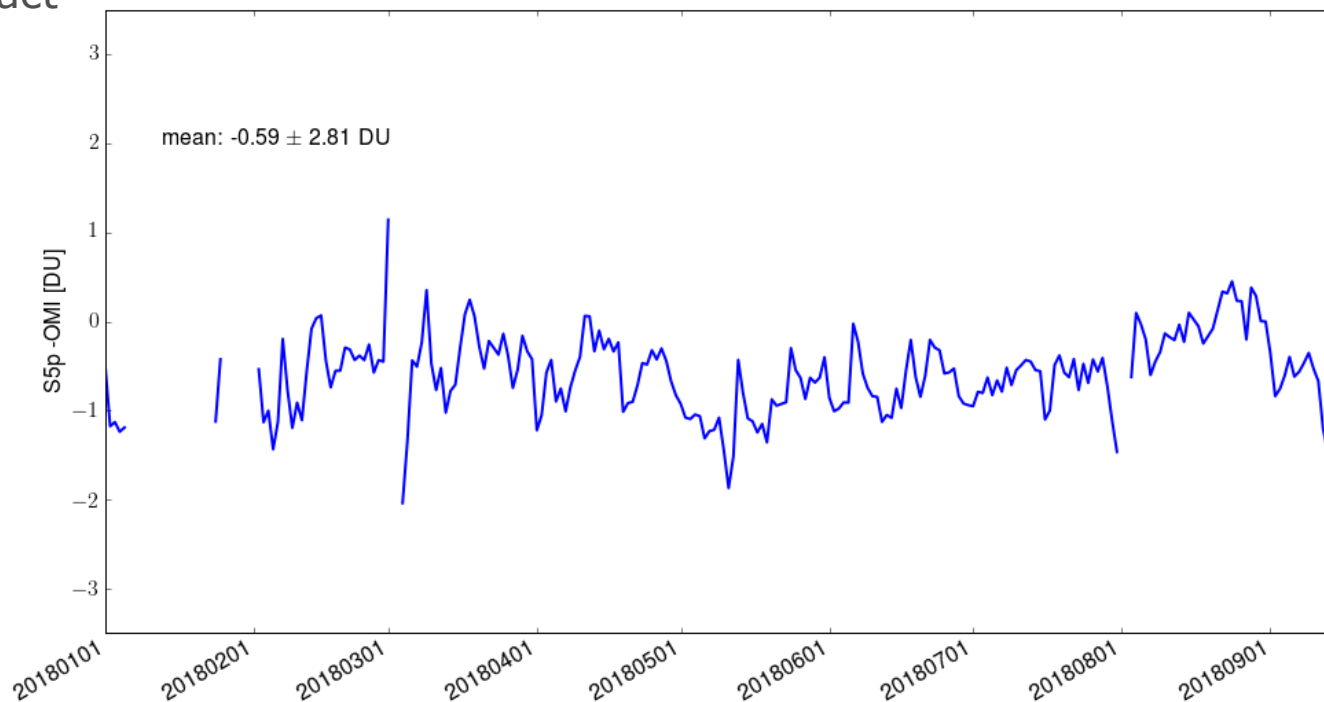


CCD applied to the CCI O3 GODFIT

Similar total ozone product

OMI 5-Days

TROPOMI 5 / 3 Days

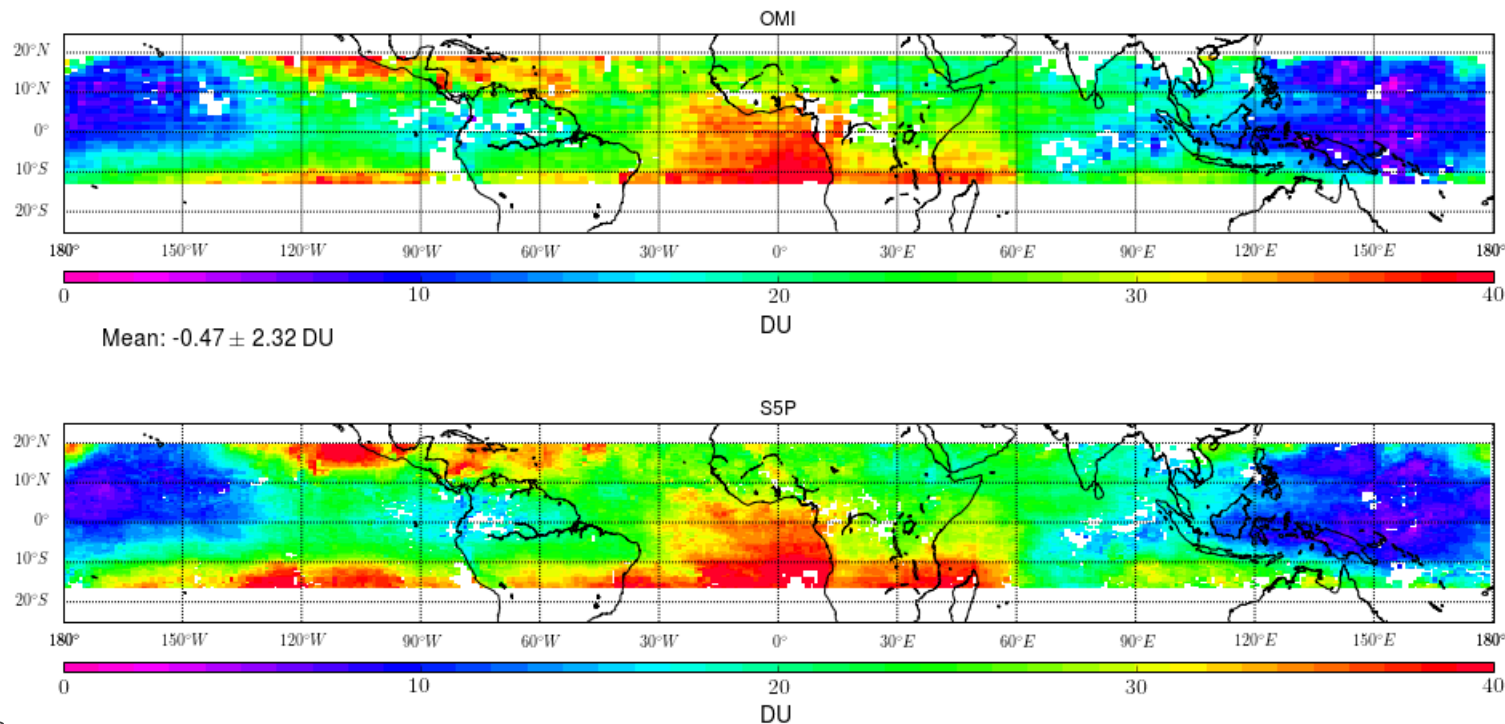


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European Space Agency

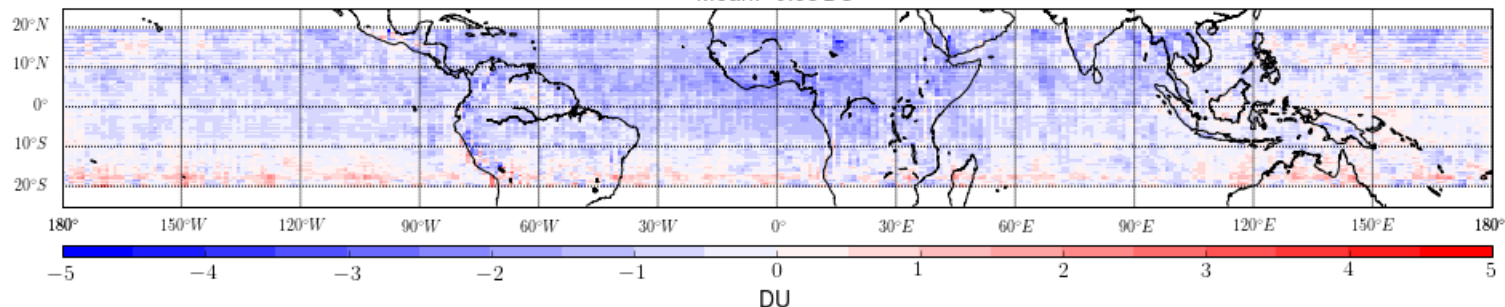
Tropospheric ozone 20180724



Difference map S5p - OMI

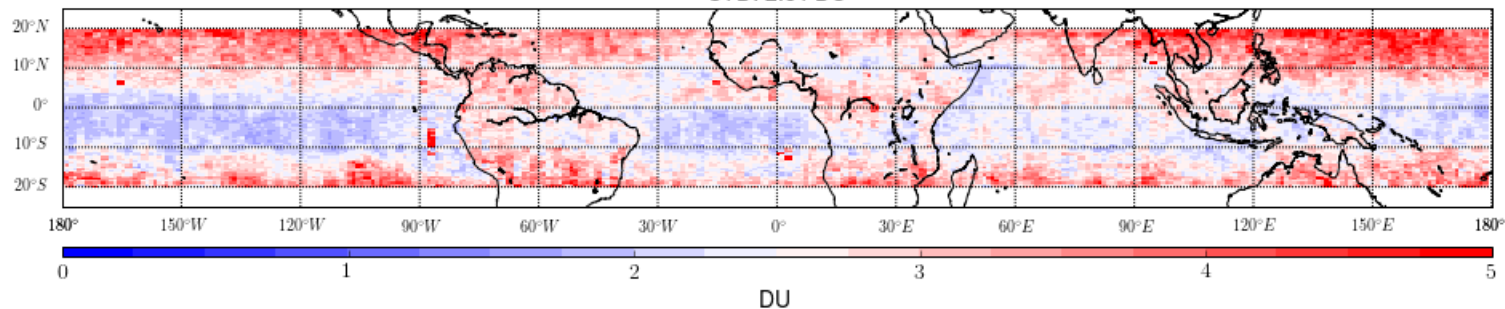
mean difference in tropospheric ozone

Mean: -0.53 DU



Mean difference between 1.1.2018-14.09.2018

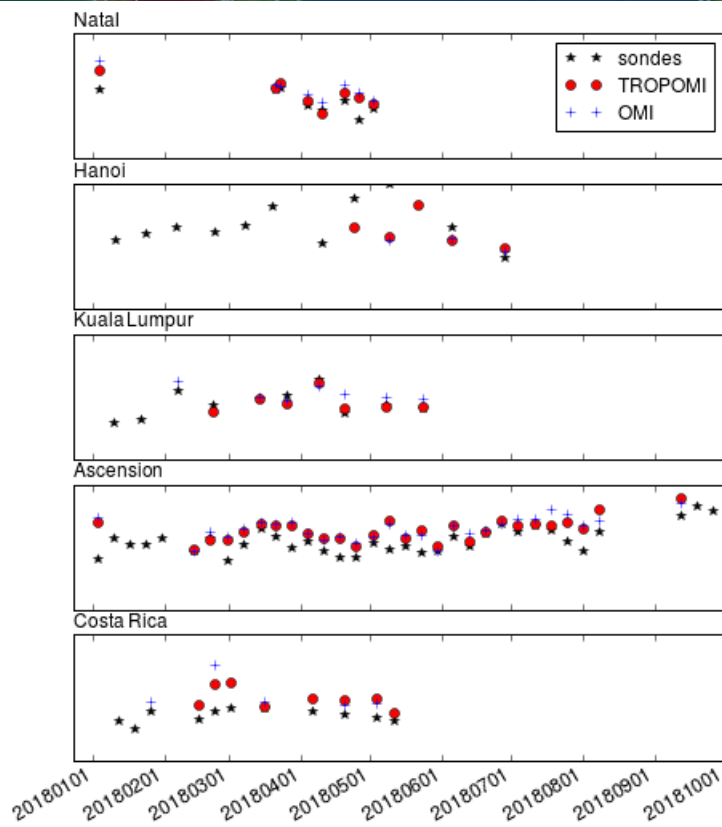
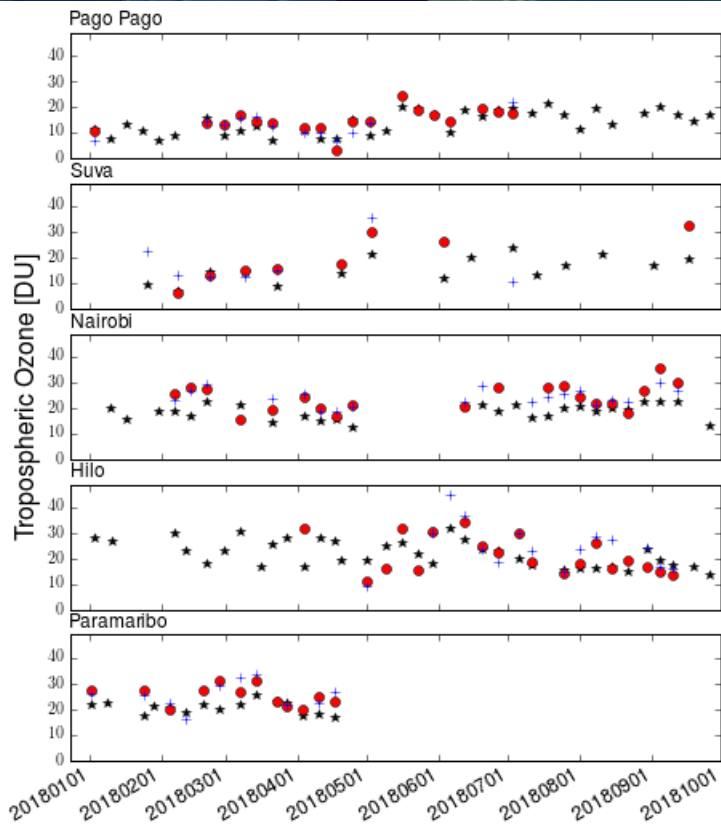
STD: 2.81 DU



Comparison to SHADOZ ozone sondes



<https://tropo.gsfc.nasa.gov/shadoz/Archive.html>



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European Space Agency

Total Ozone

- First publication from data user (CAMS) in AMTD
- Good agreement with OMPS
- Good agreement with GOME ozone hole size

Tropospheric ozone

- Validation ongoing
- Good Agreement between OMI and S5P and SHADOZ sondes
- Planned to be disseminated to the users in December 2018

Validation presented at ESA-ATMOS



16:05 Sentinel-5 Precursor Data Product Validation Approach

A. Dehn (ESA)

2.05-65 - Operational Validation of S5P TROPOMI Total and

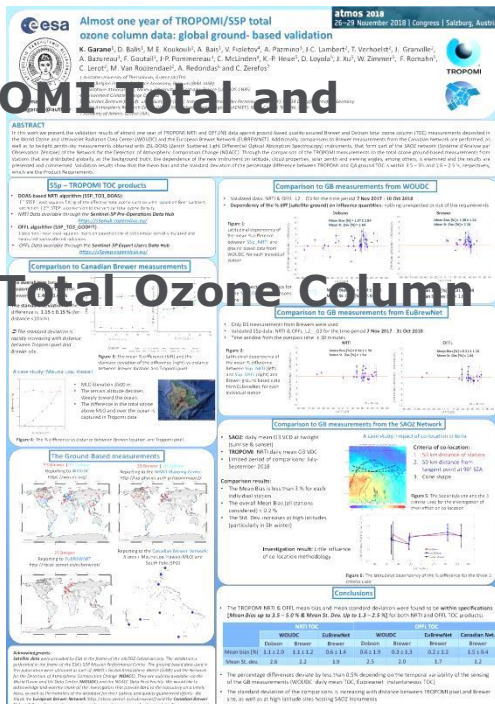
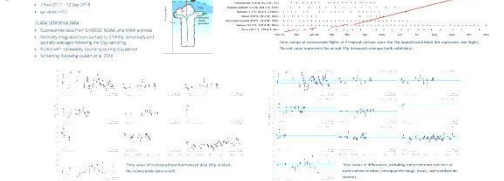
tropospheric Ozone data

Verhoelst, Tijl (BIRA, Belgium)

2.05-66 - Almost One Year Of TROPOMI/S5P Total Ozone Column Data:

Global Ground-Based Validation

Garane, Katerina (AUTH, Greece)



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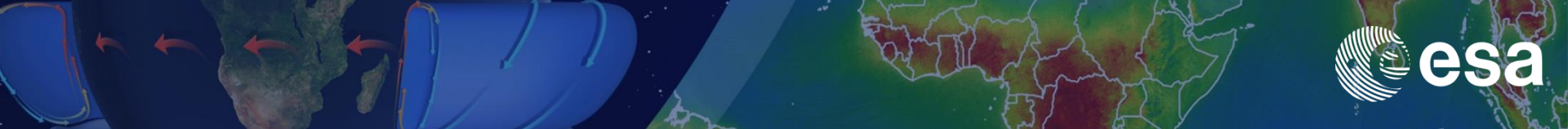
European Space Agency

Acknowledgement



- The SHADOZ teams are supported by national funding agencies
- The SHADOZ station PIs are acknowledged for providing their data
- Sentinel-5 Precursor is a European Space Agency (ESA) mission on behalf of the European Commission (EC).
- The TROPOMI payload is a joint development by ESA and the Netherlands Space Office (NSO).
- The Sentinel-5 Precursor ground-segment development has been funded by ESA and with national contributions from The Netherlands, Germany, and Belgium





Ozone hole 2018 KNMI

